

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Application No.: 10/554,359
Attorney Docket No.: Q91021

REMARKS

Claims 1, 3-20 are all the claims pending in the application. Claim 1 has been amended to incorporate the feature of Claim 2 and part of the configuration disclosed at page 34, lines 24-26 and at page 36, lines 4-27 of the specification. Claim 2 has been canceled. Claims 7 and 14 have also been amended to incorporate part of the configuration disclosed at p. 34, lines 12-17 and 24-26 and at page 52, line 2.

The specification bridging pages 40-41 has been amended to correct an obvious typographical error.

No new matter has been added.

Response to Objection to the Specification

The specification at pages 4 and 7 has been amended as suggested by the Examiner. Withdrawal of the objection is respectfully requested.

Response to Claim Objections

Claims 8, 10, 15 and 17 have been amended to recite “over-temperature”, as suggested by the Examiner. Withdrawal of the claim objections is respectfully requested.

Response to Claim Rejections Under 35 U.S.C. § 103

Claims 1, 2, 4, 7 and 14 have been rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over U.S. Publication 2002/0011484 to Beetz (“Beetz”) in view of U.S. Publication 2002/0179443 to Hada et al. (“Hada”). Applicants traverse for the following reasons.

The independent claims are claims 1, 7 and 14.

As claimed in amended Claim 1, the air heater system comprises *a resistance value control means* for controlling a resistance value of the electrothermal heating element.

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A characteristic feature of amended Claims 7 and 14 is that the semiconductor switch is fixed to the frame through a wiring board, *wherein the semiconductor switch and the wiring board are made of resin by molding.*

The Examiner was of the view that Hada discloses a control technique at [0098] similar to that of original claim 2. However, Hada fails to disclose a technique for controlling a resistance value of a heater based on output corresponding to a current that flows in the heater as required by amended claim 1. Namely, Hada discloses no more than a technique for regulating a heater control amount based on heater electric power, but fails to disclose any technique for controlling a resistance value of a heater. Also, the heater of Hada relates to energization control of a heater for heating a solid electrolyte of a gas sensor device attached to an exhaust pipe, and is not directed to a heater for heating intake air for an internal combustion engine.

In more detail, Hada et al (Abstract) teaches measuring a resistance value (impedance) of the sensor element, namely, across electrodes 33 and 34 (see [0070]) to control electric power supplied to the heater as a function of the resistance value. However, this is entirely different than controlling a resistance value *of the heating element* as required by present claim 2.

Para. [0098]-[0099] cited by the Examiner relative to claim 2 relate to duty cycle correction based on heater current, and have nothing to do with controlling electric power supplied to the heater as a function of its resistance value. In fact, the duty cycle correction cited by the Examiner assumes that the heater resistance R is constant (para. [0098] – Thus, in a case where the heater resistance R may be thought of as being constant, the correction value ...).

Accordingly, Hada fails to disclose the energization control of a heater configured to control a resistance value of an electrothermal heating element to adjust the temperature of the electrothermal heating element in multiple stages in order to bring the temperature of intake air to a temperature appropriate for an operation condition of the internal combustion engine, as recited in amended independent Claim 1. Thus, amended Claim 1 defines novel subject matter. Moreover, Hada neither teaches or suggests the feature of how to heat intake air, and does not

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provide motivation to combine the disclosure therein with the teaching of Beetz. Therefore, amended Claim 1 is also patentable over Beetz in view of Hada.

Claim 4 depends from Claim 1, and is patentable over Beetz in view of Hada for at least the same reasons Claim 1 is patentable over the cited references.

Independent Claims 7 and 14 include “making the semiconductor switch and the wiring board of resin by molding” so as to provide the semiconductor switch and the wiring board with water-proof properties. None of Beetz, Hada, or any of the other references cited by the Examiner, teaches or suggests this characteristic feature of amended Claims 7 and 14.

Further, Claims 5, 6, 12, 13, 19 and 20 were rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Beetz in view of Hada, JP 07078671 to Hidetaka (“Hidetaka”), and U.S. Patent 5,057,672 to Bohlender (“Bohlender”).

Claims 5 and 6 depend indirectly from independent Claim 1 and are patentable over Beetz in view of Hada for at least the same reasons Claim 1 is patentable over the cited references. Claims 12 and 13 depend from independent Claim 7 and are patentable over Beetz in view of Hada for at least the same reasons Claim 7 is patentable over the cited references. Claims 19 and 20 depend from independent Claim 14 and are patentable over the cited references for at least the same reasons Claim 14 is patentable over Beetz and Hada.

In view of the above, it is respectfully submitted that the rejections of Claims 5, 6, 12, 13, 19 and 20 be withdrawn.

Claims 3, 8-11 and 15-18 were rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Beetz in view of Hada, U.S. Publication 2001/0021093 to Sommer (“Sommer”) and U.S. Patent 5,823,155 to Burner (“Burner”).

Claim 3 depends from Claim 1 and is patentable over the cited references for at least the same reasons Claim 1 is patentable over the cited references. Claims 8-11 depend, either directly or indirectly, from independent Claim 7 and are patentable over the cited references for at least

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the same reasons Claim 7 is patentable over the cited references. Claims 15-18 depend either directly or indirectly from independent Claim 14, and are patentable over the prior art for at least the same reasons Claim 14 is patentable over the prior art.

Therefore, it is respectfully submitted that Claims 3, 8-11, and 15-18 are patentable over Beetz in view of Hada, Sommer and Burner, and that the rejections should be withdrawn.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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